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Eradication of poverty and other development issues

Industrial development cooperation

Note by the Secretary-General

The Secretary-General hereby transmits the report of the Director General of the United Nations Industrial Development Organization (UNIDO), submitted in accordance with General Assembly resolution 69/235.

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Report of the Director General of the United Nations Industrial Development Organization

I. Industrial development in review

A. Introduction

1. The previous report on industrial development cooperation (A/69/331) explored the concept of inclusive and sustainable industrial development, as enshrined in the Lima Declaration: towards inclusive and sustainable industrial development (GC.15/13), signed in 2013 by UNIDO member States, reasserting the importance of industry for sustainable development and laying the foundation for a renewed global effort to promote patterns of industrialization that mainstream the three dimensions of sustainable development, thereby contributing to poverty eradication, shared prosperity and the fight against climate change and other environmental damage.

2. The report already contained several of the elements of inclusive and sustainable industrialization that would be adopted as part of Sustainable Development Goal 9, Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. It did so by acknowledging the decisions taken by the Open Working Group on Sustainable Development Goals, as well as building on the commitments made at various high-level conferences, including the High-Level Conference of Middle-Income Countries held in Costa Rica in 2013 (followed by an international conference on fostering inclusive and sustainable industrial development in middle-income countries held in Minsk in 2015), the third International Conference on Small Island Developing States, the Istanbul Programme of Action for the Least Developed Countries for the Decade 2011-2020, as well as several regional calls for action on industrialization, including in Africa, such as the African Union Commission's Agenda 2063: The Africa We Want, as well as in Europe, Asia and Latin America.

3. Today, support for inclusive and sustainable industrial development as a driver for inclusive growth and sustainable development is even stronger than two years ago. As noted above, the 2030 Agenda for Sustainable Development explicitly recognizes inclusive and sustainable industrial development in its Goal 9. In addition, an approach to industrialization that mainstreams the three pillars of sustainable development permeates the 2030 Agenda in many other Goals, as outlined in section II of the present report. At the same time, the Addis Ababa Action Agenda of the Third International Conference on Financing for Development underlines in paragraph 15 "the critical importance of industrial development for developing countries, as a critical source of economic growth, economic diversification, and value addition". The third major global conference held in 2015, culminating with the Paris Agreement on climate change, also directly links industry with efforts to combat climate change and adapt to its negative effects.

4. There is a growing recognition that peace and security cannot be achieved without tackling the underlying causes of the crises that are responsible for countless deaths, the disruption of human settlements and environmental ecosystems and the migration of millions looking for better life opportunities. The World Humanitarian Summit in May 2016 has paved the way towards a new framework

that explores the nexus between the development and humanitarian pillars of United Nations activities. Emergency response is crucial in order to address the immediate needs of populations in crisis situations. There is also a growing recognition of the need to move beyond humanitarian action and address the economic self-reliance of refugees and migrants, as well as to support countries and people in tackling the root causes of conflict. In both of those areas, inclusive and sustainable industrial development, with its emphasis on entrepreneurship development, decent job creation and climate and environmental resilience, will have an increasingly substantial role.

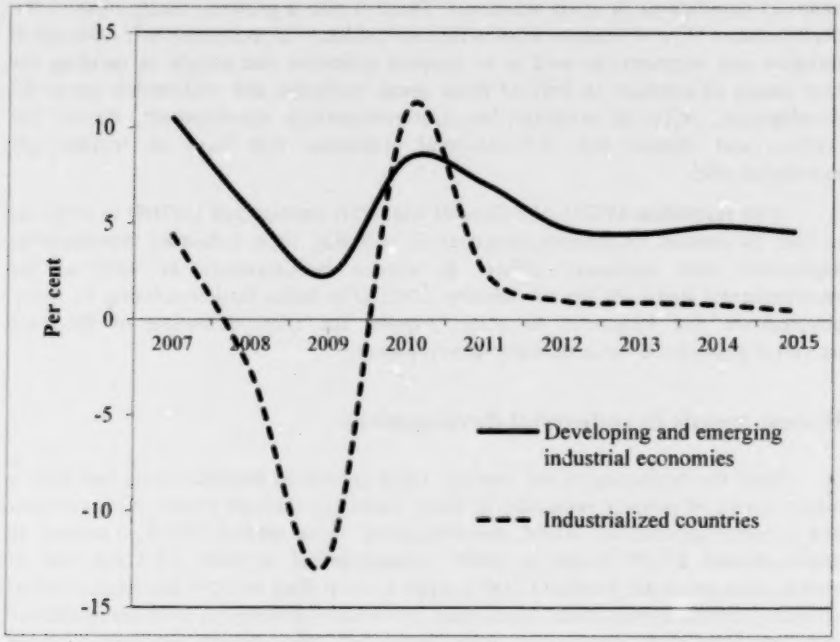
5. In its resolution 69/235, the General Assembly encouraged UNIDO to continue to link its actions to support countries in realizing their industrial development aspirations with increased efforts to ensure inclusiveness as well as the environmental sustainability of industry. UNIDO is today further refining its tools, programmes and structures to better support the implementation of the new universal framework for sustainable development.

B. Recent trends in industrial development

6. Since the beginning of the century, rapid growth in manufacturing has been a major source of poverty reduction in many countries through employment creation and income generation. World manufacturing value added (MVA) reached an unprecedented $7,390 billion at 2005 constant prices in 2010 (18.2 per cent of global gross domestic product (GDP)), after a sharp drop in 2009 during the global economic and financial crises. Since then, MVA has recovered in both industrialized and industrializing economies, with much of that growth emanating from developing countries. In 2014, global MVA reached $9,228 billion at 2005 constant prices.

7. Recently the MVA growth rate of developing and emerging industrial economies has decelerated, mainly owing to falling commodity prices and adverse conditions for external finances, dropping to 4.5 per cent in 2015 from 5.4 per cent in 2014 (see figure I). As a result, global manufacturing production has experienced yet another year of low growth, of only 2.8 per cent in 2015.

Figure I
Annual growth of manufacturing value added, by country group, 2007-2015

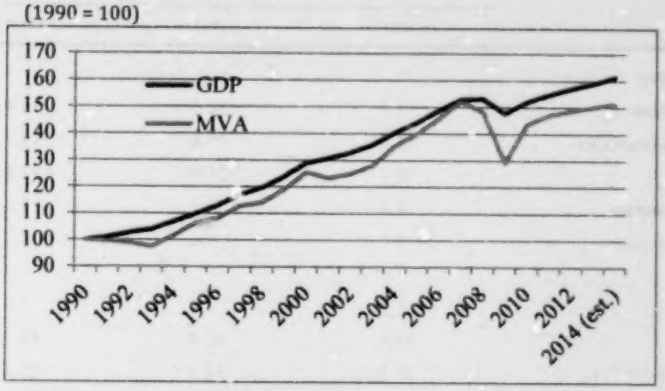


Source: UNIDO statistical database.

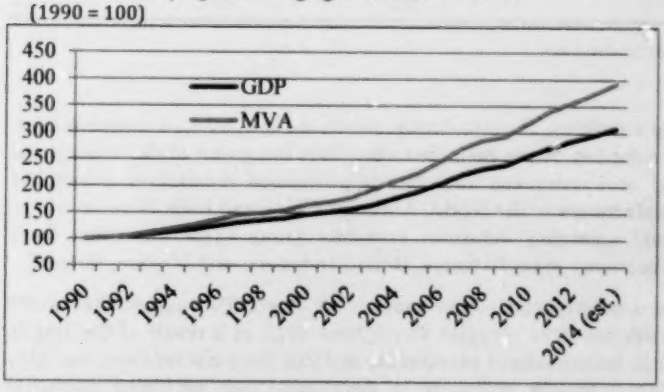
8. In developing and emerging industrial economies, MVA has grown strongly, at a remarkable 5.6 per cent annual average rate from 1990 to 2010, a rate slightly higher than the 4.8 per cent GDP growth rate. By 2014, it had almost quadrupled, representing a key driving force of overall economic growth for many of those countries. On the other hand, MVA in industrialized countries rose by only 51.3 per cent during the same period (see figure II).

Figure II
Economic and industrial growth trends by country group, 1990-2014

Change in gross domestic product and manufacturing value added in industrialized countries
(1990 = 100)



Change in gross domestic product and manufacturing value added in developing and emerging industrial economies
(1990 = 100)



Source: UNIDO statistical database.

9. In developed countries, the MVA share of GDP fell from 15.4 per cent in 1990 to 14.5 per cent in 2014, and rose from 16.2 to 20.5 per cent in developing and emerging industrial economies. Over the same period, the share of MVA in world GDP increased from 15.6 per cent to 16.2 per cent.

10. There were sharp variations in manufacturing performance among regions and developing countries (see table). Asia and the Pacific remains the largest manufacturing region by far, with an estimated share of global MVA of 48.1 per cent in 2015. Africa's MVA remains the smallest, currently accounting for around 2 per cent of global manufacturing production.

Manufacturing value added by country group and region, selected years, at constant 2010 prices

(Constant 2010 United States dollars)

	Percentage of manufacturing value added		
	2010	*2013*	*2015[a]*
By development group			
Industrialized economies	61.4	58.0	56.4
Emerging industrial economies	15.9	15.8	15.3
China	18.7	21.9	23.8
Other developing countries	3.5	3.6	3.8
Least developed countries	0.6	0.6	0.7
By region			
Africa	1.8	1.9	2.0
Asia and Pacific	44.0	46.5	48.1
Europe	27.5	26.3	25.6
Latin America	7.2	7.1	6.4
North America	19.3	18.2	18.0

Source: UNIDO statistical database.

[a] Estimate.

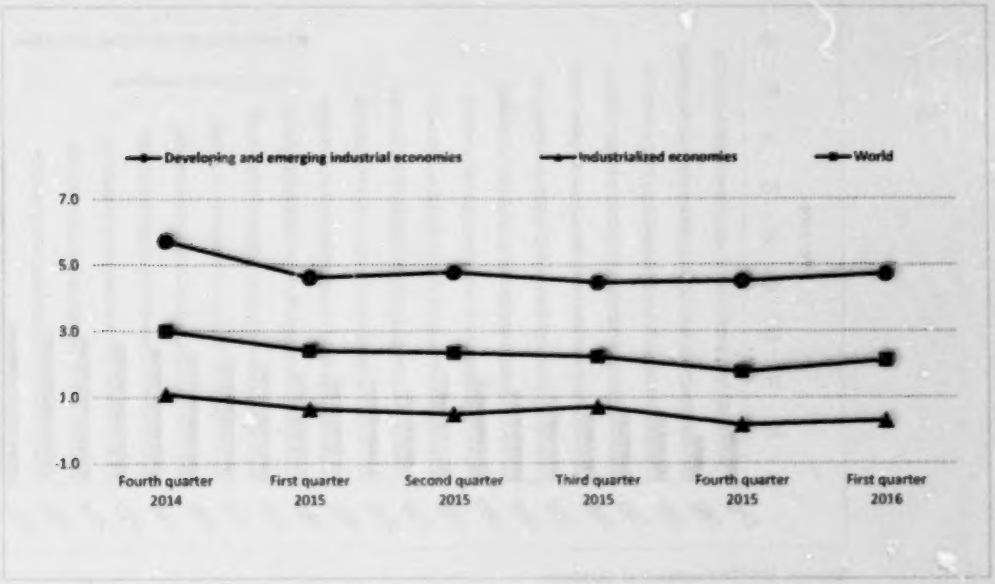
11. In developing countries, manufacturing shows a high level of concentration. China and India are the two major manufacturers from the group of developing and emerging industrial economies and have firmly positioned themselves among the top 10 leading manufacturers in the world. Although China and India have improved their developing and emerging industrial economy group share, the other three largest developing economy manufacturers, Brazil, Indonesia and Mexico, faltered.

12. However, the quarterly production indexes in figure III suggest that world manufacturing growth has been sluggish throughout 2015 as a result of the fragile economic recovery in industrialized economies, and that the slow recovery has also significantly weakened growth prospects in developing and emerging industrial economy countries.

13. The slow recovery of industrialized economies and their dependence on external markets has exposed national structural problems in developing and emerging industrial economies, which have been further exacerbated by falling oil prices, the compression of demand in national markets and fluctuations in commodity prices.

14. Despite the prolonged period of weak growth, developing and emerging industrial economies contributed around 90 per cent of global manufacturing growth in the first quarter of 2016. During that period, manufacturing output in those countries increased by 4.7 per cent, slightly higher than in the previous quarter (4.5 per cent). As depicted in figure III, the pace of growth in both country groups exhibits similar trends, but growth has been consistently higher in developing and emerging industrial economies than in industrialized countries.

Figure III
Growth rate (percentage) in world manufacturing output by quarter, by country group



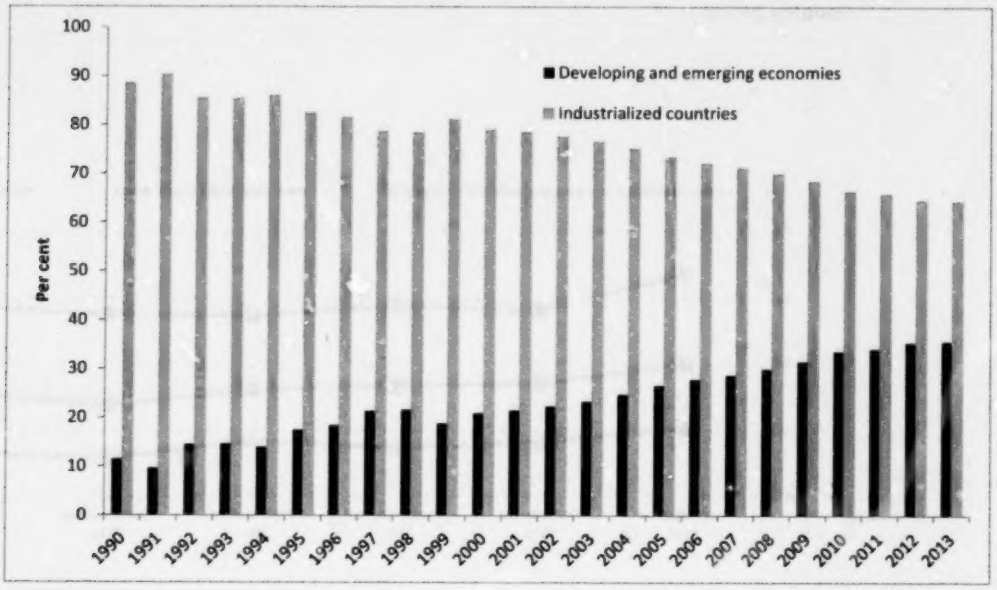
Source: UNIDO statistical database.

15. An increasingly export-oriented manufacturing sector has further translated into a greater presence of developing countries in the global trade of manufactured goods. World export growth rates averaged 7.7 per cent annually from 2005 to 2013, and in 2013 world trade reached a peak of more than $18 trillion, with 84 per cent comprising manufacturing products.

16. Manufactured goods exports from industrialized countries expanded by an annual average of 5.2 per cent during the 2005-2013 period, reaching $8,929 billion in 2013. Meanwhile, developing countries' manufactured goods exports more than doubled compared with 2005, with an 11.5 per cent annual average, to peak at $4,937 billion.

17. As shown in figure IV, the share of developing and emerging industrial economies in world manufacturing trade has increased sharply from 1990 to 2013. That upward trend is expected to continue over the next years, reflecting their high growth rates and the consolidation of their middle classes. In addition, the dependence of those countries on industrialized-country markets is expected to decline as they move towards more advanced manufacturing sectors.

Figure IV
Share in world manufactured exports by country group, 1990-2013



Source: UNIDO statistical database.

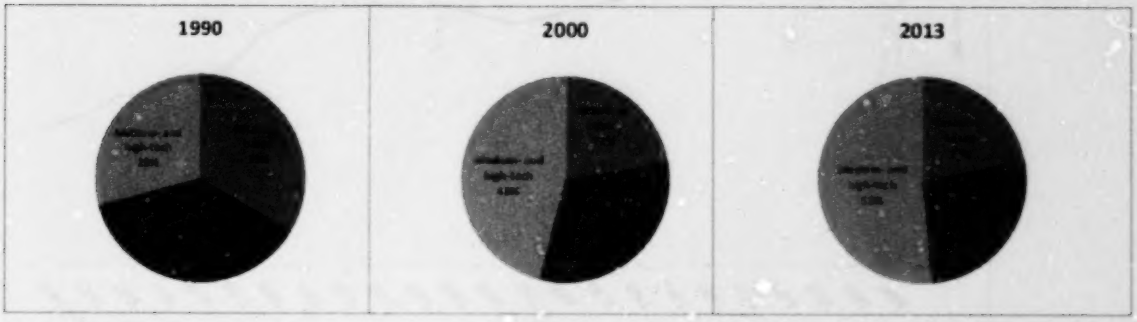
18. It is widely recognized that the benefits of exporting manufactured goods are greater than those of exporting primary commodities, largely due to the fact that higher value added can be created and higher and more sustainable economic and social returns can be captured from the former. The more complex the production structures of a country become, the greater the opportunities for division of labour, technological learning and development, industrial and economic diversification, social inclusion and institutional upgrading.

19. Advanced economies have increased their focus on more technology-intensive industries, which have enhanced the productivity of labour in manufacturing and altered the composition of the labour force away from unskilled towards semi-skilled and skilled workers, who receive higher wages. With globalization, developing economies — particularly in East Asia — have also become more integrated into global value chains and production networks, with better access to technology, information and markets. The success of developing and emerging industrial economies therefore stems from concentrating on trade in manufactured goods, driven by sound policies.

20. Around 58 per cent of the world's manufactured exports now consist of medium- and high-tech manufactured goods, such as chemical machinery and equipment, communication equipment and motor vehicles. The share of resource-based industry in global manufacturing fell from 33 per cent in 1990 to 28 per cent in 2013, while the share of medium- and high-technology products increased from 44.6 per cent to 46.7 per cent, during the same period.

21. Remarkably, developing and emerging industrial economies have seen a progressive move into the production and export of more complex manufactures, as they expanded their share in world exports of medium- and high-tech products by an average annual 6.4 per cent from 2005 to 2013 (see figure V). Some 52 per cent of manufactured exports from that country group now comprise medium- and high-tech products, up from 29 per cent and 46 per cent in 1990 and 2000, respectively.

Figure V
Technology structure of manufactured exports in developing and emerging industrial economies, 1990, 2000 and 2013

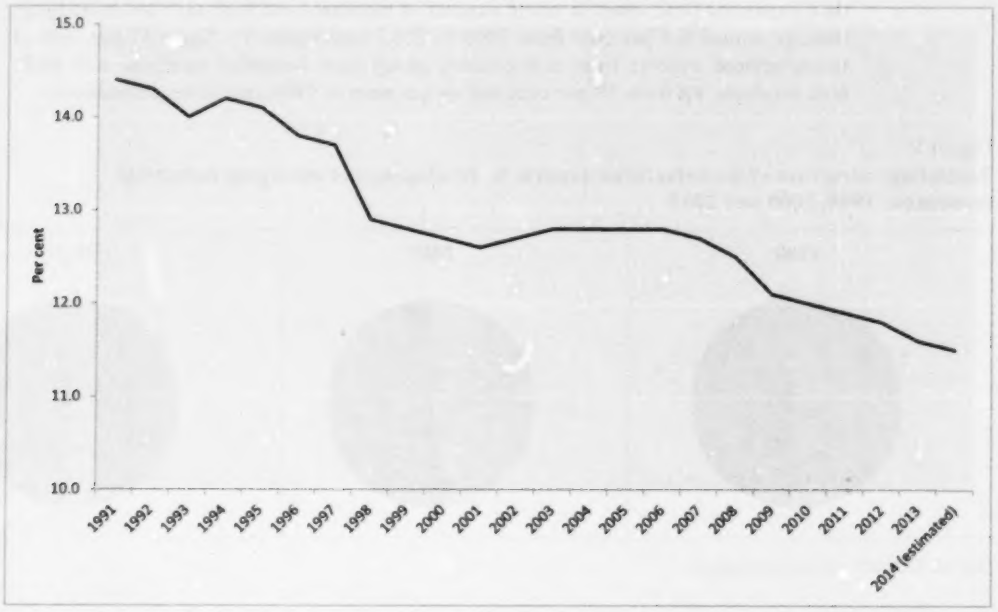


Source: UNIDO statistical database.

22. Even though both industrialized economies and developing and emerging industrial economies raised their share of medium- and high-tech production from 2000 to 2013, industrialized countries retained the most high-value-added or technologically complex activities while outsourcing labour-intensive and simple activities. In 2013, medium- and high-tech products accounted for more than half of MVA in industrialized countries, increasing from 46.3 per cent in 1990 to 50.1 per cent in 2013.

23. Manufacturing employment fell globally from 18.7 to 16.6 per cent of total employment from 1970 to 1990, and from 14.4 to 11.5 per cent between 1991 and 2014 (see figure VI).

Figure VI
Share of manufacturing employment in total employment worldwide, 1991-2014



Source: UNIDO statistical database.

24. The decline in the global share of manufacturing employment has been largely driven by its fall in industrialized countries. That tendency in industrialized countries is marked by the rapidly growing share of services, together with the increasing relocation of manufacturing to emerging markets to reduce labour costs.

25. In contrast, manufacturing employment in developing and emerging industrial economies had risen to 304 million by 2014, up from only 234 million jobs in 1991. However, the share of manufacturing employment in total employment during the same period declined slightly from 12.7 per cent to 11.2 per cent in that country group. That decline raises concerns, as jobs created by industry remain crucial to poverty reduction in many countries. That trend may also point towards premature de-industrialization in some developing countries, in which case the share of manufacturing in GDP and total employment starts to decline much earlier than seen in today's advanced industrialized economies. If that occurs, it may be a serious threat to the potential that manufacturing offers through technological learning, innovation, development and the creation of jobs and of the middle class.

26. The most important feature of manufacturing employment trends over the last 40 years has been the rise of informal employment,[1] which increased from 27.1 to 39.9 per cent from 1970 to 2010, compared with formal employment, which fell from 53.4 to 42 per cent during the same period. A lack of structural transformation

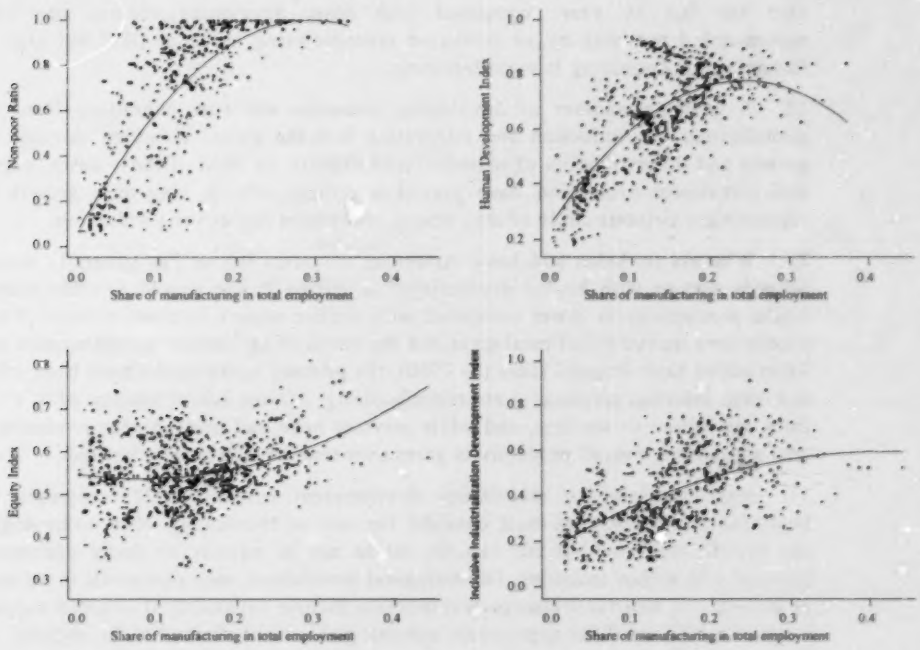
[1] Informal manufacturing jobs in that context include not only workers who are not fully protected by labour legislation but also jobs in small and medium-sized enterprises (under 10 employees) and the self-employed.

and industrialization in some developing countries may result in the exclusion of large segments of the population from the benefits of economic growth, and ultimately in growing inequality.

27. Least developed countries and other countries in Africa remain on the margins of industrialization, as exemplified since the 1970s by their very low and declining shares of MVA in GDP and population growth that is faster than GDP growth.

28. Figure VII highlights the positive correlation between manufacturing and indicators of social inclusiveness. Data from the Non-Poor Ratio, the Human Development Index, the Equity Index and the Inclusive Industrialization Development Index all demonstrate strong linkages between manufacturing and lower levels of poverty, better income distribution and better human development rankings.

Figure VII
Inclusive indices by share of manufacturing in total employment, 1970-2010


Non-poor Ratio
Human Development Index
Equity Index
Inclusive Industrialization Development Index
Share of manufacturing in total employment
Share of manufacturing in total employment
Share of manufacturing in total employment
Share of manufacturing in total employment

Source: *Industrial Development Report 2016. The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development* (United Nations publication, Sales No. E.15.II.B.47).

29. The UNIDO analysis also includes an observation of the share of different industries in total manufacturing employment in order to explore the role of industries that have different technological characteristics in driving social inclusiveness. When an additional explanatory variable capturing the share of low-, middle- and high-tech industries in total manufacturing employment is included, the results suggest that the larger the share of high-tech industries, the greater the

positive impact of industrialization on social inclusiveness in terms of income equity and broader social development.

C. Conclusions on recent trends in industrial development

30. Globalization of production and trade, through the formation of global value chains and production networks, has resulted in a faster growth in trade in goods and services than that in MVA because fragmented production processes require parts, components and sub-assemblies to cross borders, sometimes more than once, before final goods are produced and shipped to final markets. Manufacturing production has also shifted from developed to developing and emerging industrial economy countries even faster, as firms move to benefit from lower production costs and growing markets.

31. As income in many developing and emerging industrial economies grows and capital deepening ensues, those countries will have to turn to innovation-driven industrial development to sustain their economic growth. Asia's economic success over the last 40 years compared with other developing regions has been accompanied not only by an increased manufacturing share in GDP but also by technological upgrading in manufacturing.

32. A growing number of developing countries are now benefiting from the globalization of production and integration into the global economy through the growth and diversification of manufactured exports. In most of those cases, export and investment promotion have played a critical role in long-term growth by supporting a virtuous circle of investment, innovation and poverty reduction.

33. Whereas in Asian and Latin American countries labour has generally moved towards sectors with higher productivity, in Africa it has moved towards sectors where productivity is lower compared with similar sectors in other regions. While people have moved out of rural areas and the shares of agriculture in employment and value added have dropped since the 1960s, the primary beneficiaries have been urban and often informal services — not manufacturing. African labour has tended to move from agriculture to services, and while services have had much higher productivity than agriculture, overall productivity gains over time have been very limited.

34. Any discussion of sustainable development within the 2030 Agenda for Sustainable Development must consider the role of technology. New technologies can benefit the poor but the benefits might not be equally or fairly distributed between and within countries. Technological innovations may also result in patterns of growth and structural change that increase income inequality if targeted support is not ensured, and if the appropriate technologies are not adapted to the context.

II. Industrial development and the 2030 Agenda for Sustainable Development

A. Inclusive and sustainable industrial development and the Sustainable Development Goals

35. Infrastructure can accelerate economic linkages and networks through the integration of modern transport infrastructure with logistics and industrial value chains. Agglomerations and other growth benefits could be realized from productive and innovation hub development around transport nodes and important urban centres. Greater connectivity, network development and market integration, combined with policies to promote industrial agglomerations and strengthen small and medium-sized enterprise clusters and networks along and between the production value chains, together with policies on fostering deeper regional economic integration though corridor approaches, will lead to greater industrial diversification and productivity. By enhancing the business infrastructure, countries can start that virtuous growth cycle.

36. Resilient infrastructure contributes to lowering the carbon and environmental footprint of industry and facilitates the optimal location of industrial agglomerations within urban and peri-urban areas, thereby minimizing associated health, safety and environmental risks in cities.

37. Many developing countries lack strategic planning in promoting the development of modern infrastructure. Appropriate regulation, which is vital for investor confidence and for the development of projects financed from international funding streams, is also lacking. Strategy design and implementation are in turn hindered by limited institutional, technical and financial capacity. Strengthening development cooperation in that area is therefore called for.

38. Industry, with its strong multiplier effect on all economic sectors (1 job in manufacturing can create 2.2 jobs elsewhere in the economy) by providing decent jobs and expanding the fiscal revenues needed for social investments, can boost capacity for socially inclusive development. Production processes that are less carbon-intensive can reduce the consumption of non-renewable resources and minimize greenhouse gas emissions while also stimulating innovation, technological change, economic diversification and job creation. The Paris Agreement has several direct implications for policy addressing industrial emissions. Inclusive and sustainable industrial development is recognized as a primary engine of technology development and transfer, skills development, productivity growth, infrastructure and green technology development and adoption and further investments in productive activities.

39. Promoting new innovative industries and technologies as well as scientific research and innovation is important. However, only a few actors, who tend to be concentrated in developed countries, often seize the new opportunities opened by innovative solutions. With the proper policy framework and international cooperation in place, the benefits of innovation and technological progress, including the new industrial revolution that is currently taking place, which is driven by the digitalization of the economy, increased automation, additive manufacturing and widespread connectivity, can be shared more widely.

40. Leveraging the benefits from the industrialization-infrastructure-innovation nexus is critical for driving economic development in the context of the globalization of production and trade. Countries must invest in the development of quality, reliable, sustainable and resilient transport and energy infrastructure (including regional and transborder), as well as in innovation infrastructure (for national and regional innovation systems to develop). A new economic policy supporting the development of transport, energy and innovation infrastructure can boost trade, promote economic diversification and competitiveness and accelerate inclusive and sustainable industrial development in developing countries.

41. Inclusive and sustainable industrial development is associated with job creation, sustainable livelihoods, innovation, technology and skills development, food security and equitable growth — some of the key requirements for eliminating poverty by 2030, as set out in Sustainable Development Goal 1. Therefore, any strategy for sustained growth must ensure industrialization processes that create opportunities that are accessible to all people while distributing income and non-income gains more equally.

42. There is an obvious link between industrial development and Sustainable Development Goal 8, "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all". Progress on Goal 8 will be achieved through growth processes that entail structural transformation from low to higher productivity activities, typically through industrialization.

43. Closely linked to inclusive and sustainable industrial development is Sustainable Development Goal 12, "Ensure sustainable consumption and production patterns". Because global consumption and production patterns are closely interrelated, a shift towards sustainable patterns of consumption is possible only in parallel with a shift towards sustainable industrial production and consumption patterns. Closer international cooperation will be needed, as will a multi-stakeholder approach to promote the share of renewable energy in total energy consumption and to make production less carbon- and natural resource-intensive.

44. As already mentioned, efforts aimed to mitigate the effects of climate change (Sustainable Development Goal 13), and adapt to its disruptive impacts, which often hit least developed countries the hardest, cannot ignore the industrial dimension. Indeed, reducing industrial emissions while improving the resilience of productive systems to natural disasters in both developing and developed countries is central to climate action.

45. Pursuing inclusive and sustainable industrial development will have direct and indirect implications for all other Sustainable Development Goals, from realizing food security (Goal 2) through inclusive and sustainable agro-food value chains to the potential of industry to drive inclusive and sustainable economic growth in urban contexts (Goal 11) and the importance of industrialization to reduce inequality within and across countries (Goal 10). Inclusive and sustainable industrial development is further relevant to ensuring healthy lives through local pharmaceutical manufacturing development that can improve the affordability of medicines and better cater to local health (Goal 3) as well as to the implications of safe and sustainable water use by industrial facilities (Goal 6). Inclusive and sustainable industrial development also contributes to building and maintaining the preconditions for peaceful societies (Goal 16) by creating decent jobs, and has a

catalytic role of attracting investments in productive activities from public and private financial resources, thus revitalizing the Global Partnership for Sustainable Development (Goal 17). The positive effects of inclusive and sustainable industrial development throughout the broader 2030 Agenda for Sustainable Development are potentially momentous.

B. Leave no one behind: inclusive industrialization

46. Empowering the most vulnerable groups in society, namely women, youth, migrants, minorities and people living in rural environments, is essential for any development strategy aimed at eradicating poverty and combating inequalities.

47. Least developed countries remain the weakest link in global economic development and have the largest numbers of people in poverty. They suffer from weak human and institutional capacities, low levels of industrial diversification, significant informal sectors and low and unequally distributed income. Lack of industrial and economic diversification and high dependence on a few commodities, often from the extractive sector, for export and tax earnings makes them highly vulnerable to external shocks.

48. Both extreme and moderate poverty remain primarily rural, with 75 per cent of the world's poor living in rural areas. Rural poverty has persisted where policies have failed to improve agro-industrial productivity and rural infrastructure or to provide rural populations with access to social services or facilitate the development of rural business linkages.

49. Agro-industries, as a component of manufacturing, where value is added to raw agricultural materials through processing, preservation, preparation and other handling processes, contribute to post-harvest loss reduction, enhanced food safety and quality, improved export performance, job and income creation and overall economic development. The agribusiness sector holds great promise for inclusive economic growth. There is a positive correlation between human development and the agribusiness-to-agriculture ratio. Policies aimed at enhancing the productivity of agro-industries, using modern technologies and training and skills upgrading for smallholders on cleaner production and material-resource management, are crucial for inclusive and sustainable development.

50. The functional and geographical fragmentation of value chains is causing structural changes in the global economy. For developing countries, trade, investment and knowledge flows in global value chains can provide mechanisms for rapid learning and innovation. Linking to leading players in global value chains potentially also offers greater prospects to enter new markets, to gain access to new skills, knowledge and information and to upgrade their industrial capabilities. Global value chains alone are not, however, sufficient for sustainable and inclusive growth and do not ensure upgrading. Effective participation in global value chains requires substantial investments in human capital and specific skills, infrastructure (hard and soft), logistics and financial services. Public policies and collective actions involving local clusters, foreign players and government at different levels (central to local) are important in supporting effective linkages with key players in global value chains.

51. Small and medium-sized enterprises are crucial for addressing inequality and ensuring greater inclusiveness through their immense potential for employment creation and income generation. Small and medium-sized enterprises in developing countries face special barriers and need to be well equipped to compete effectively in global, regional and even national markets and to participate effectively in regional and global value chains.

52. Participation by small and medium-sized enterprises in global value chains requires targeted policies such as the creation of agribusiness incubators. The policies should act on several fronts, from simplifying access to finance to providing a range of management, technological and training services, including direct financing. Some governments might consider fostering industrial agglomerations by concentrating investment in institutions, services and infrastructure in a limited territory, such as special economic zones or industrial parks. It is important, though, that they are linked to the national economy and do not encourage any "race to the bottom" on, for example, wages and working conditions.

53. The Addis Ababa Action Agenda makes it clear that financial resources will continue to fall short of development needs unless strong commitment and innovative solutions are put in place. Private investment, development finance and export earnings remain by far the biggest potential sources of funding for long-term industrial development. In that context, increased national resource mobilization efforts, based on fostering business environment conditions that will allow the private sector to thrive and actively engage, will be central for strengthening the financial capacity of developing countries. Tailored regulatory and incentive frameworks that allow for the alignment of commercial interests with environmental and social aspirations are also necessary.

54. Official development assistance (ODA) will remain an important way of mitigating some of the risks associated with investments in developing countries. A key challenge will be to sustain ODA and maximize its development impact.

55. Challenges also remain in leveraging resources for infrastructure development. If a supporting, modern, resilient infrastructure is not in place, there will not be progress in economic development.

56. Multi-stakeholder platforms that address barriers to the uptake of clean technologies and provide predictable financing to mitigate climate change are fundamental to remedying social problems. Harnessing clean technologies, promoting technology transfer and innovation, diversifying funding and facilitating partnerships for climate resilient development are key to the implementation of the Sustainable Development Goals.

57. As rapid urban growth is mainly taking place in developing countries, industry plays an important role in supplying clean energy, environmental goods and technologies and creating new and decent jobs, thereby promoting smart and inclusive cities and ensuring both the climate resilience and the environmental sustainability of urbanization.

58. An inclusive and sustainable industrial development policy approach can contribute to disaster risk reduction efforts by strengthening economic and environmental resilience and human security, building institutions and providing sustainable energy for the poor.

59. Concerted actions are called for to deal with potential repercussions resulting from significant technological and industrial changes associated with the new industrial revolution, namely job losses and the risk of social and economic marginalization.

C. Harnessing the potential of the "new industrial revolution" for sustainable development

60. The digitalization of the economy affects the entire value chain, from conceptualization to product design, manufacturing, distribution and recycling. Integration of manufacturing with state-of-the-art information and communication technology and the combination of big data analysis, cloud computing and "the Internet of Things enables increasingly autonomous and intelligent manufacturing, where the physical components of industrial production are being transformed by smart digital networking into cyberphysical systems.

61. The new industrial revolution is expected to lead to a new wave of physical and geographical fragmentation of global value chains in which processes are managed through intelligent object networking and increased interaction between the real and virtual worlds. Many production processes are managed in real time across great distances.

62. The new industrial revolution has the potential to continuously enhance total factor productivity, increase energy and resource efficiency and further the transition to a circular economy (an industrial economy in which, when products reach the end of their useful lives, they are reused, remanufactured and recycled). Taken together, those developments might lead to the emergence of more sustainable production and consumption patterns.

63. The speed of development of new technologies and innovation inherent in the new industrial revolution can create "short-cycle technology-based" industries, where new technologies become outdated relatively quickly. Those sectors may be more advantageous for latecomers, because they have lower entry-level barriers and there is little risk of being locked into old technologies. It might offer developing countries an opportunity to leapfrog to the latest digital technologies and techniques.

64. Increased automation is, however, not expected to affect all sectors equally. While sectors such as computers and electronics, home appliances, transportation and machinery are increasingly being automated, other more traditional and very labour-intensive activities, such as the production of garments and shoes, have seen minimal automation so far. That is because automation makes more economic sense in some sectors than in others, and existing technology does not allow for automation in some sectors at present.

65. Many analysts predict that the new industrial revolution will also cause a polarization of the labour force, with an increasing share of employment in high- and low-wage jobs and a decreasing share of employment in middle-wage jobs. That includes the outsourcing and offshoring of manufacturing processes driven by factors such as cost of labour and transportation. At the same time, a reverse trend is likely to take place in manufacturing, namely reshoring or the repatriation of production from low-cost locations back to developed economies. That is usually connected to increased concerns about quality and the collocation of production and

research and development. That trend is likely to favour developed economies, given that research and development facilities are mainly located in developed rather than developing countries.

66. A concentration of low-wage jobs in developing countries is likely, because high-wage jobs will require increased digital skills, and weak education systems in developing countries often fail to provide basic skills in literacy and mathematics. The new industrial revolution is likely to go hand in hand with increased demands for science, technology, engineering and mathematics (STEM) qualifications in manufacturing. The skills bottleneck is likely to be felt most in developing countries.

67. Developing countries need to create effective training systems for a new generation of innovation and entrepreneurship educators. National systems of entrepreneurship and business education, which would facilitate start-up formation and foster collaboration between various actors, take time to establish and function effectively.

68. For the new industrial revolution to become a catalyst to reinvigorate the supply side and to create new demand, countries need to develop vibrant new industries and renovate existing ones to absorb labour. Failure to transform structurally will lead to a transfer of labour from more-productive to less-productive manufacturing industries and reduce the productivity and growth of the economy as a whole.

69. Partnerships between companies and research institutes and other developing countries on new industrial revolution technologies could play an important role in ensuring that developing countries are not trapped behind the "technology frontier". That might offer small and medium-sized enterprises, in particular, the opportunity to enter new markets, to gain access to new skills, knowledge and information and to upgrade their industrial capabilities.

III. Response of the United Nations Industrial Development Organization

A. Introduction

70. UNIDO is well positioned to fulfil its renewed mandate of fostering inclusive and sustainable industrial development and to support countries in their efforts to achieve the industry-related Sustainable Development Goals. UNIDO has aligned its strategic guidance document and services to the 2030 Agenda for Sustainable Development, and has established an integrated approach to promote economic growth and poverty eradication through industrialization.

71. UNIDO member States adopted the medium-term programme framework 2016-2019 during its sixteenth General Conference, which sets the broad programmatic objectives and priorities and guides the organization's strategic, programmatic and operational actions over the next four years. The programme framework for 2016-2019 takes into account the Lima Declaration and the recommendations relating to the management criteria of the "Strategic Guidance Document" of the UNIDO Industrial Development Board (IDB.41/24), and is determined by the 2030 Agenda for Sustainable Development and its related Goals, as well as the United Nations system-wide coherence mechanisms, including the

United Nations Resident Coordinator system and the quadrennial comprehensive policy review of operational activities of the United Nations.

72. The programmatic focus of UNIDO comprises three thematic priorities: creating shared prosperity, advancing economic competitiveness and safeguarding the environment. Each of those programmatic fields is implemented through the organization's four functions, which include technical cooperation; analytical and research functions and policy advisory services; normative functions and standards and quality-related activities; and convening and partnerships for knowledge transfer, networking and industrial cooperation. The organization also delivers cross-cutting activities in the areas of industrial statistics, research and policy guidance; standard setting; and the promotion of knowledge-sharing platforms and multi-stakeholder partnerships.

73. UNIDO continues to engage deeply with United Nations institutions and has engaged constructively in the Economic and Social Council dialogues on operational activities for development. It contributed to the Council integration and high-level segments that address the interplay of the three dimensions of sustainable development and cross-cutting issues and to the high-level political forum on sustainable development, which is the central platform for follow-up and review of the 2030 Agenda for Sustainable Development.

74. The organization provided information for a number of reports issued by the Secretary-General, most notably on the quadrennial comprehensive policy review. UNIDO participated in inter-agency discussions and ensured that the guiding principles set out in General Assembly resolution 67/226 on the quadrennial comprehensive policy review were coherently aligned with the organization's mandate. UNIDO is gradually aligning its strategic planning cycles with the policy review cycle and it is expected that its medium-term policy framework and the new quadrennial comprehensive policy review cycle will be fully aligned by 2021.

75. As a member of the Advisory Group of the United Nations Development Group, UNIDO has actively contributed to the United Nations System-wide Coherence approach for a coordinated response to States' needs through the One United Nations initiative. It has also responded effectively to evaluations and assessments carried out by the Joint Inspection Unit.

B. Programmatic focus

Creating shared prosperity

76. UNIDO continues to concentrate its efforts on the development of agro-industries, empowering women and youth in productive activities and human security in post-crisis situations. The organization's efforts to stimulate agribusiness and rural development in its beneficiary countries have focused mainly on agro-industries value chain upgrading, entrepreneurship development programmes and vocational training.

77. UNIDO, in collaboration with the Food and Agriculture Organization of the United Nations, as part of the African (Accelerated) Agribusiness and Agro-industries Development Initiative, supported African countries in value chain development, the promotion of agribusiness investment and agro-enterprise development. UNIDO works closely with other international organizations and developing finance

institutions to enhance recipient countries' competiveness in agro-industries through providing technical support to Africa's agriculture sector.

78. The integration of women into higher-skilled and better-paying productive activities remains a priority in many UNIDO interventions. The principal partner of UNIDO on gender equality and the empowerment of women is the United Nations Entity for Gender Equality and the Empowerment of Women (UN-Women). In partnership with the Sustainable Energy and Climate Resilience Initiative, UNIDO is pioneering a flagship initiative to promote gender mainstreaming in the sustainable energy sector of small island developing States in Africa, the Pacific and the Caribbean and Indian Ocean regions.

79. UNIDO has developed an integrated approach that assists governments and supports organizations to serve young people who want to improve their livelihoods through the creation of enterprises. UNIDO continues to work with key stakeholders on national strategies to strengthen the entrepreneurial ecosystem and building the capacities of key financial institutions to offer improved financial and non-financial services to small and medium-sized enterprises, in particular those run by women or youth. The UNIDO Productive and Decent Work for Youth programme assists would-be entrepreneurs by identifying sectors and value chains with a high potential for youth employment. Through its Computer Model for Feasibility Analysis and Reporting software, COMFAR, it assesses the financial feasibility of setting up businesses and teaches entrepreneurs the requisite skills.

80. The organization's post-crisis assistance is focused on activities that foster economic recovery, rehabilitate damaged agricultural or industrial infrastructure, raise skills for greater employability, create employment opportunities and stabilize communities.

Advancing economic competitiveness

81. UNIDO continues to assist States in designing appropriate industrial policies and technical cooperation programmes on industrial upgrading and modernization, small and medium-sized enterprise and entrepreneurship development, industrial agglomerations, trade capacity-building, investment and technology promotion, and on leveraging the benefits of the infrastructure-industrialization-innovation nexus through industrial corridor development approaches.

82. The dynamic nature of inclusive and sustainable industrial development requires sustained and continuous action at the policy level. UNIDO has therefore expanded its industrial policy advisory services. Policy tools such as a programme to create strategic industrial intelligence and governance mechanisms[2] support governments throughout the industrial policymaking cycle, providing advice, capacity-building and facilitation; creating and training autonomous national implementation teams and industrial intelligence units in influential government agencies; and establishing industrial observatories and overall guidance in the elaboration of industrial diagnosis. The organization's policy toolkit is further enriched by the methodologies for growth identification and facilitation for industrial upgrading and diversification. The UNIDO Institute for Capacity-Development, in addition to its educational role,

[2] See http://www.unido.org/fileadmin/user_media/Publications/Research_and_statistics/Branch_publications/Research_and_Policy/Files/Brochures/Strategic%20industrial%20intelligence%20and%20governance.pdf.

continues to serve as a global forum to support policy dialogue activities and knowledge networks.

83. The organization's approach in assisting developing countries to harness the benefits of increased globalization is to develop efficient local value and supply chains and to leverage participation in regional and global value chains for accelerating catch-up through setting up and supporting export consortiums for linking local clusters to global value chains and helping local enterprises take advantage of industrial subcontracting and outsourcing.

84. Over the last 25 years, UNIDO has established networks of subcontracting and partnership exchanges that provide an information portal for matching suppliers and buyers, and has been effective in dealing with short-term buying contracts. The networks are expanding, with funding committed for new centres in Gabon, the Islamic Republic of Iran and Oman. Further adjustments to the networks are made in terms of supplier profiling according to distribution of gender at different functional layers of a company's work force, based on which concrete actions are proposed to achieve gender balance within the enterprise.

85. The greatest challenge for many suppliers in developing countries that hope to reach export markets is to produce goods that meet international standards and respective market requirements. UNIDO therefore continues to support States in designing programmes to support local suppliers to meet the standards requirements of the markets they supply; establish quality and food safety infrastructure and address sanitary and phytosanitary technical barriers to trade; strengthen regional quality infrastructure and improve the quality and delivery of support services in standardization, conformity assessment and accreditation; meet the standards of sustainable fishing; and provide an enabling economic environment to ease compliance with international trade rules and technical regulations.

86. In addition to the updated version of the *Trade Capacity-building Resource Guide*, UNIDO produced a new issue of its *Meeting Standards, Winning Markets — Trade Standards Compliance* report that presents new approaches to the analysis of the capacity of developing countries to comply with such standards, the challenges they confront and the implications of their failure to comply.

87. The organization's Investment and Technology Promotion Offices offer a complete service for potential investors and suppliers of technology to developing countries, ranging from the latest information on investment opportunities to how to do business in unfamiliar environments. The Offices steer investors through each stage of the investment cycle and broker partnerships between enterprises in developing and industrialized countries.

88. UNIDO applies a differentiated focus for advancing economic competitiveness that is based on the diverse needs of developing countries. Least developed countries continue to be a major focus for UNIDO in terms of its policy advisory, convening and programmatic and technical cooperation functions. The sixth Ministerial Conference of the Least Developed Countries, held in November 2015 in Vienna, discussed how to mainstream inclusive and sustainable industrial development into their national development strategies and policies, and explored the means to leverage external finance to support their graduation. UNIDO plays a key role in a number of United Nations system-wide initiatives for small island developing States.

89. While least developed countries need strategies that address barriers impeding economic diversification and graduation from that status, middle-income countries require strategies for overcoming the so-called middle-income trap. UNIDO is working closely with middle-income countries to address their challenges and to encourage partnerships between middle-income countries and high-income countries through establishing knowledge-sharing platforms and tailored cooperation programmes.

90. UNIDO supports landlocked developing countries in addressing the adverse effects associated with geography and structural weaknesses, such as poor infrastructure and slow structural transformation, through designing technical cooperation programmes that leverage benefits of the industry-infrastructure-innovation nexus and partnership approaches.

Safeguarding the environment

91. UNIDO is dedicated to fostering the production and uptake of environmental goods and services and improving the environmental performance of industry. UNIDO programmes promote industrial development that is both resource-efficient and protective of the natural environment and human health. In that way, nations will be able to advance their competitiveness and access markets while at the same time reducing their environmental footprint. The programmes focus on promoting clean and renewable energies; smart cities and low-carbon transport; fostering energy and resource efficiency and cleaner production; advancing a circular economy; developing resource stewardship programmes; and implementing the various multilateral environmental agreements.

92. The UNIDO renewable energy programme promotes the establishment of mini-grids based on viable and proven technologies, such as small hydropower, biomass, solar energy and wind. The UNIDO industrial energy efficiency programme focuses on policy and standards, building capacity, raising awareness and demonstrating new technologies. It also encourages the implementation of energy management systems based on the International Organization for Standardization's energy management standard (ISO 50001) and energy system optimization. The UNIDO low-carbon low-emission clean energy technologies programme provides a comprehensive technology transfer mechanism based on several building blocks: an assessment of technological and socioeconomic needs and identification of appropriate clean energy technologies; demonstration projects; public-private partnerships for scaling up the demonstrated technologies; and new business models. That multi-pronged approach helps create small businesses and sustainable jobs, and offers potential solutions to address simultaneously the challenges of climate change, energy poverty and unsustainable industrialization in developing countries.

93. UNIDO and the United Nations Environment Programme (UNEP) host the Climate Technology Centre and Network, which was set up in Copenhagen in 2013 as the operational arm of the Technology Mechanism of the United Nations Framework Convention on Climate Change. The Network supports developing countries in adopting clean technologies for pursuing energy-efficient, low-carbon and climate-resilient development. It provides technology solutions, capacity-building and advice on policy, legal and regulatory frameworks tailored to the needs of individual countries. The Network counts on the support of a broad community of climate technology stakeholders from academia, finance, non-governmental

organizations, the public and private sector and research, as well as more than 100 national focal points selected by their countries. The network is engaged in some 1,500 activities in more than 150 countries.

94. UNIDO provides technical support for the establishment and operation of the Global Network of Regional Sustainable Energy Centres — a South-South and triangular partnership. There are currently eight centres: the Caribbean Centre for Renewable Energy and Energy Efficiency; the Centre for Renewable Energy and Energy Efficiency of the Economic Community of West African States; the East African Centre for Renewable Energy and Energy Efficiency; the Himalayan Centre for Renewable Energy and Energy Efficiency; the Mesoamerican Centre for Renewable Energy and Energy Efficiency; the Pacific Centre for Renewable Energy and Energy Efficiency; the Regional Centre for Renewable Energy and Energy Efficiency of Arab States; and the Southern African Centre for Renewable Energy and Energy Efficiency. The centres provide valuable support to projects implemented by UNIDO and other international organizations, facilitate the implementation of the Sustainable Energy for All initiative, complement national activities and promote South-South cooperation.

95. UNIDO technical cooperation supports the circular economy model by providing solutions to decouple production value chains from the depletion of natural resources and the degradation of the environment. The circular economy approach increases the resource efficiency of manufacturing processes; facilitates the development, adoption and maintenance of environmentally friendly products; extends the useful lifespan of products; and enables the sustainable management of industrial waste. Establishing eco-industrial parks and converting existing industrial zones into eco-industrial parks are emblematic of the organization's approach to promoting a circular economy.

96. UNIDO efforts to help countries comply with multilateral environmental agreements, such as the Montreal Protocol on Substances that Deplete the Ozone Layer, are strongly supportive of the circular economy.

97. The organization's activities under the Montreal Protocol have contributed to the phase-out of 71,000 tons of ozone-depleting substances per year between 1990 and 2015. UNIDO is assisting industry around the world with the phase-out of hydrochlorofluorocarbons (HCFCs). In addition to eliminating ozone-depleting substances, the projects seek technology options that minimize climate impact through the adoption of substances with low global warming potential. Women and children tend to suffer more than men from exposure to persistent organic pollutants. For that reason, many UNIDO projects designed to reduce or eliminate persistent organic pollutants draw attention to the specific dangers facing women. Gender activities are embedded in all programming and projects of the organization's Stockholm Convention on Persistent Organic Pollutants programme.

98. The year 2015 marked 20 years of successful implementation of the global Resource Efficient and Cleaner Production (RECP) programme, run by UNIDO and UNEP. The programme focuses on accelerating the application of preventive environmental strategies to processes, products and services in order to use natural resources more efficiently and reduce risks to humans and the environment.

99. The RECP programme is delivered at the national and regional levels through the Global Network for Resource Efficient and Cleaner Production (RECP*net*),

which brings together more than 70 providers of RECP services around the world. RECP*net* consists of 74 members, with 12 members in Africa, 6 in Arab States, 16 in Asia and the Pacific, 24 in Europe and Central Asia and 16 in Latin America and the Caribbean. New national RECP programmes were launched in 2015 in Bosnia and Herzegovina and Ecuador.

100. An environmental problem that cities also have to face is electronic waste, or e-waste. The e-waste stream is rapidly growing in developing countries. UNIDO programmes help devise and put in place a sustainable business model for handling e-waste, creating new jobs for skilled and unskilled workers.

101. UNIDO also developed a comprehensive approach for sound and innovative management of chemicals in industry. A core element of the approach is chemical leasing: a circular business model pioneered by UNIDO in developing and transitional economies. It aims at maximizing the utility derived from expensive and hazardous substances in industry while minimizing their cost and environmental impact.

UNIDO partnership approaches

102. During the reporting period (August 2014 to August 2016), UNIDO organized three inclusive and sustainable industrial development forums. Those followed on from the first forum, held in June 2014, which engaged States in a dialogue to formulate strategies and policies that promote inclusive and sustainable industrial development. The second forum, held in November 2014, showcased to private and public stakeholders the organization's Inclusive and Sustainable Industrial Development Programme for Country Partnerships through two pilot countries (Ethiopia and Senegal) and initiated a partnership dialogue among UNIDO, recipient governments, development finance institutions, development agencies, the private sector and donors. The third Inclusive and Sustainable Industrial Development Forum was held in Addis Ababa on 14 July 2015 as a special event to the Third International Conference on Financing for Development. The fourth forum, held in Vienna on 30 November and 1 December 2015, addressed how UNIDO can contribute to advancing industry, infrastructure and innovation in the context of Sustainable Development Goal 9.

103. The Programme for Country Partnerships approach is a new type of UNIDO assistance package for its member States: a custom-built partnership formula based on national needs and required support. The Programme mobilizes development partners, United Nations agencies, development finance institutions and the private sector — under the leadership and ownership of the national government — to advance inclusive and sustainable industrial development in alignment with the government's national development strategy.

104. Throughout the sixteenth session of the General Conference in November and December 2015, participants agreed that UNIDO had a central role to play in implementing the 2030 Agenda for Sustainable Development. At the General Conference, Peru was selected as a third country to participate in the Programme for Country Partnerships.

IV. Conclusions and recommendations

105. **Recent trends in industrial development present both opportunities and challenges for developing and emerging industrial economies. As production processes fragment under the influences of growing globalization and digitalization of production and trade, manufacturing production continues to shift to developing and emerging industrial economies in search of low-cost locations and growing markets.**

106. **At the same time, the new industrial revolution is likely to cause reshoring, or the repatriation of some manufacturing back to developed economies. There is a risk that current trends in technological progress could widen inequalities between and within countries, leaving the marginalized and vulnerable further behind. Harnessing the potential offered by the new industrial revolution for inclusive and sustainable industrial development and minimizing its negative externalities requires concerted efforts by the international community through knowledge-sharing and targeted support.**

107. **Some developing and emerging industrial economies, notably in Asia, have benefited from policies that focused on leveraging linkages with global value chains and production networks for structural transformation, industrialization and integration into the global economy. Many least developed countries have been unable to harness the investments and put in place the policies necessary to integrate effectively into the global economy, and have remained on the margins, as exemplified in the very low and declining shares of their MVA in GDP.**

108. **While manufacturing employment has increased in developing and emerging industrial economies, there is a tendency for growth in employment in the informal sectors to outpace that of formal sector employment. That carries risks both economic and social, especially in least developed countries, and underscores the urgency of pursuing policies aiming to promote inclusive and sustainable industrial development within the 2030 Agenda for Sustainable Development.**

109. **With the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals, the General Assembly adopted a universal vision of creating equitable, prosperous and environmentally sustainable societies, marking the transition to a new era in the global fight against poverty. The 2030 Agenda recognizes that inclusive and sustainable industrialization is integral to the effort to realize many of the Goals. UNIDO has a key role to play in supporting countries to pursue inclusive and sustainable industrial development and other industry-related Goals, in collaboration with other United Nations agencies, international financial institutions, donors and the private sector. In the years ahead, UNIDO will further consolidate its role as the reference organization supporting national efforts towards inclusive and sustainable industrialization — recognized as instrumental for the achievement of the Goals.**

110. **UNIDO should continue to build upon its abilities to mobilize multi-stakeholder partnership approaches that identify and foster country-specific modalities to pursue inclusive and sustainable industrialization, as a pathway for efforts to narrow many of the widening development gaps that characterize the current global development situation.**